Forest Statistics Series:

West Virginia No. 3

Forest Statistics for the Eastern Section of West Virginia

Northeastern Forest Experiment Station

Upper Darby, Pennsylvania
Ralph W. Marquis, Director

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United States Department of Agriculture • • • Forest Service

FOREWORD

This is the third in a new series of reports about forest areas and timber volume in the State of West Virginia. It is a product of the forest survey of the Northeast, carried on by the Northeastern Forest Experiment Station as part of the Nation-wide forest survey being made by the Forest Service, U. S. Department of Agriculture.

This report supersedes the preliminary statistical report that was issued for Pendleton, Pocahontas, and Randolph Counties in 1949. The volumes in that preliminary report were computed from standard volume tables. However, local volume tables, constructed when the survey was completed for the entire State, showed that the average tree in West Virginia has more taper than was provided for in the volume tables originally used. This meant, of course, that the preliminary volume estimates were too high.

In addition, a recently completed study of log quality in the State showed that some of the material that was originally included in the hardwood saw-timber volume is unsuitable for standard lumber, tie, or timber logs. The total saw-timber volume has been reduced further to correct for this.

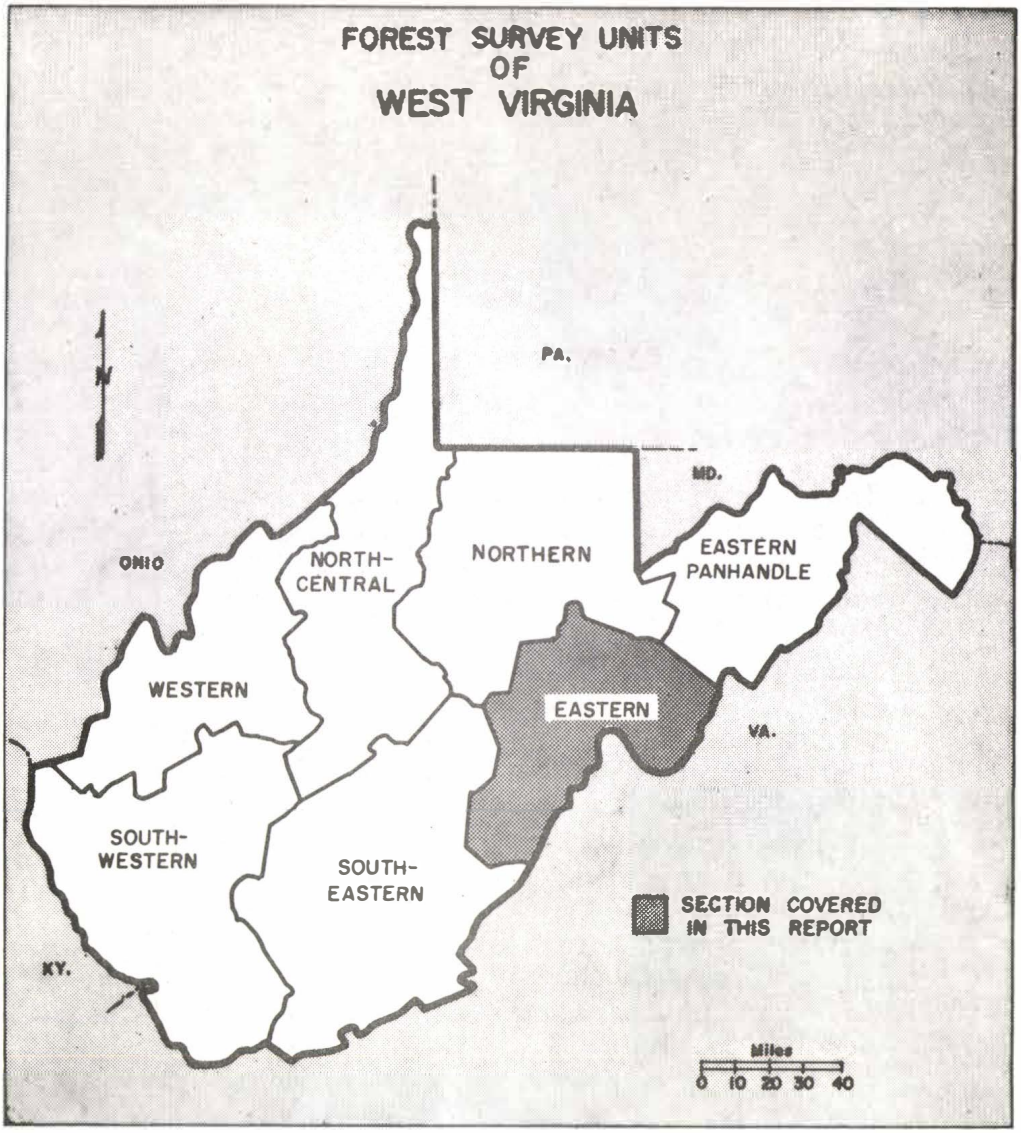
The West Virginia Conservation Commission provided some of the aerial photographs used in this survey, and assigned a number of Commission employees to assist in carrying out the field work. Some of the photographs were provided by the Monongahela National Forest.

Similar reports will be issued for the other five sections of the State.

Field work in this section of West Virginia was supervised by Harry W. Camp, Jr. C. Allen Bickford developed the statistical procedures used in the survey. Computations were made under the supervision of Roland H. Ferguson.

Ralph W. Marquis
Director

CONTENTS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FOREST STATISTICS

FOR THE

EASTERN SECTION

OF WEST VIRGINIA

by

Robert D. Wray, *forest economist*

Northeastern Forest Experiment Station
Forest Service, U.S. Dept. Agriculture

GENERAL

The Eastern Section of West Virginia lies immediately southwest of the Eastern Panhandle Section; it includes Pendleton, Pocahontas, and Randolph Counties. The eastern part of this section is cut up by high, straight ridges that run parallel to the Virginia border. West of these mountains the land levels off to a high, rolling plateau.

The area feeds water to three great rivers: the Potomac to the east, the Monongahela to the northwest, and the Great Kanawha to the southwest.

The Forest Area

These three counties contain 1.7 million acres of land--more than 10 percent of the land in the entire State.

Three out of every four acres in all three counties are forested.

Commercial forest land amounts to 1,325,000 acres. In addition there are 14,000 acres of forest land reserved from commercial cutting, and 6,000 acres of forest land that are not considered capable of producing stands of commercial timber.

Randolph County alone--largest in the State--contains 528,000 acres of forest land. Pendleton County contains 333,000 acres and Pocahontas 464,000.

Ownership

This section contains more Federally owned forest land than all the rest of the State. More than 40 percent of the commercial forest land here is in either the Monongahela or the George Washington National Forest.

One-fourth of the forest land is owned by farmers. The rest is held by other private owners. The largest single private forest-land owner is a lumber company that holds more than 50,000 acres.

The Forest Types

The major single forest type in these counties is sugar maple-beech-yellow birch; this type occupies 39 percent of the forest land. The red oak, white oak, and chestnut oak types combined cover 42 percent. Other hardwood types occupy 8 percent of the forest land.

Softwood types are found on 11 percent of the forest area. The most extensive of these are the spruce types; they occupy 6 percent of the forest area.

Condition Of The Forests

Nearly 65 percent of the saw-timber volume occurs on 27 percent of the forest land. This is the land that averages more than 5,000 board feet per acre.

About 35 percent of the forest land has stands of 1,500 to 5,000 board feet per acre. The remaining 38 percent has little or no saw timber but is variously stocked with pole-timber trees and seedlings and saplings.

In general, the forests in this section have a better ratio of volume to area than any other section of the State. The average acre in the Eastern Section contains 2,500 board feet of saw timber. The average for all the other sections is less than 2,000.

Timber Volume

There are 3.3 billion board feet of saw timber in the three counties. Sixty percent of this volume is in five hardwood species--red oak, yellow birch, chestnut oak, beech, and sugar maple. Only 14 percent is in softwood species, chiefly red spruce. The rest is distributed among other hardwood species.

(Although all of the volume reported above meets the requirements for saw timber, some of it is not operable from a strictly business viewpoint. Operability depends upon species, quality, volume per acre, accessibility, markets, and so on. These are the things that help determine whether one can cut timber and make money. However, it is not within the scope of this statistical report to distinguish between operable and inoperable timber stands. The purpose here is merely to report the total amount of timber that exists in this part of West Virginia. These statistics will be analyzed later in a comprehensive report for the entire State.)

The growing stock amounts to slightly less than 1.2 billion cubic feet. About 53 percent of this volume is in saw-timber trees; the rest is in pole-timber trees.

The total cubic-foot volume is the equivalent of 14.5 million cords. Almost 69 percent of this volume is in trees of less than 15 inches' diameter.

EASTERN SECTION OF WEST VIRGINIA

Table 1.--Land area and forest area, 1949

Class	Area	
	Acres	Percent
Forest land[1]:		
Commercial	1,325,200	78
Noncommercial	19,800	1
Total forest land	1,345,000	79
Nonforest land[2]	366,400	21
All land[3]	1,711,400	100

[1]See Appendix for definitions.

[2]Includes about 7,000 acres of water in areas less than 40 acres.

[3]From Areas of the United States 1950, Bureau of the Census.

EASTERN SECTION OF WEST VIRGINIA

Table 2.--Commercial forest area by ownership, 1949

Ownership	Area	
	Acres	Percent
Private:		
Farm forest land[1]	376,200	28
Other private	388,300	30
Total private	764,500	58
Public:		
National forests[2]	540,200	40
State[3]	20,500	2
Total public	560,700	42
All ownerships	1,325,200	100

[1]Census of Agriculture, 1950.

[2]Includes 45,700 acres on the George Washington and 494,500 acres on the Monongahela National Forests.

[3]Includes 11,000 acres in the Seneca State Forest and 9,500 acres in the Kumbrabor State Forest.

EASTERN SECTION OF WEST VIRGINIA

Table 3.—Commercial forest area by forest type, 1949

Forest type	Area	
	Acres	Percent
Sugar maple-beech-yellow birch	511,700	39
Red and white oak types	415,600	31
Chestnut oak	144,600	11
Other hardwood types	104,000	8
Spruce types	88,500	6
Other softwood types	60,800	5
All types	1,325,200	100

EASTERN SECTION OF WEST VIRGINIA

Table 4.--Commercial forest area by stand-size class, 1949

Stand-size class	Area	
	Acres	Percent
Saw-timber stands:		
More than 5,000 bd. ft. per acre	359,000	27
1,500-5,000 bd. ft. per acre	467,900	35
Pole-timber stands:		
More than 600 cu. ft. per acre	149,100	11
200-600 cu. ft. per acre	222,900	17
Other stands	126,300	10
All stands	1,325,200	100

EASTERN SECTION OF WEST VIRGINIA

Table 5.--Net volume of live timber on commercial forest land by species, 1949

Species	Growing stock		Saw timber[1]
	Thousand cu.ft.	Equivalent in cords[2]	Thousand bd.ft.
Red oak	169,200	2,115,000	666,500
Yellow birch	120,300	1,503,800	347,900
Chestnut oak	124,500	1,556,200	347,600
Beech	107,000	1,337,600	321,500
Sugar maple	90,000	1,125,000	304,400
Red maple	88,900	1,111,200	163,500
Basswood	45,500	568,800	127,800
White oak	38,100	476,200	90,000
Hickory	37,200	465,000	89,100
Yellow-poplar	24,500	306,200	69,000
Black cherry	12,000	150,000	56,500
Cucumbertree	11,500	143,700	54,800
Other hardwood	157,200	1,965,100	189,900
All hardwood	1,025,900	12,823,800	2,828,500
Spruce	80,100	1,001,300	247,000
White pine	20,100	251,200	92,600
Hemlock	21,300	266,200	77,100
Hard pine	16,700	208,800	46,800
All softwood	138,200	1,727,500	463,500
All species[3]	1,164,100	14,551,300	3,292,000

[1]International $\frac{1}{4}$-inch log rule.

[2]Rough standard cords. 1 cord = 80 cubic feet.

[3]In addition there are 105 million cubic feet (net volume) in live cull trees.

EASTERN SECTION OF WEST VIRGINIA

Table 6.--Net volume of live timber on commercial forest land by diameter class, 1949

Diameter class[1] (inches at breast height)	Growing stock	Saw timber
	Thousand cu.ft.	Thousand bd.ft.
Hardwood:		
6	151,400	--
8	171,300	--
10	181,300	--
12	94,000	397,500
14	96,600	475,300
16	79,100	431,000
18	73,300	420,000
20	60,900	352,500
22	29,400	174,600
24	12,700	77,800
26	27,200	172,600
28	16,700	109,100
30 and larger	32,000	218,100
All hardwood	1,025,900	2,828,500
Softwood:		
6	13,400	--
8	26,700	--
10	23,700	93,400
12	21,000	97,800
14	21,300	102,100
16	13,300	68,700
18	9,400	49,500
20 and larger	9,400	52,000
All softwood	138,200	463,500
Softwood and hardwood	1,164,100	3,292,000

[1] The midpoint of each 2-inch diameter class is indicated.

EASTERN SECTION OF WEST VIRGINIA

Table 7.--Average net volume per acre of live timber on commercial forest land, by stand-size class, 1949

Stand-size class	Growing stock	Saw timber
	Cubic feet	Board feet
Saw-timber stands:		
More than 5,000 bd.ft. per acre	1,490	5,920
1,500-5,000 bd.ft. per acre	880	2,150
Pole-timber stands:		
More than 600 cu.ft. per acre	770	650
200-600 cu.ft. per acre	400	260
Other stands	120	40
All stands[1]	880	2,500

[1]Hardwood constitutes 86 percent of the total board-foot volume, or 88 percent of the total cubic-foot volume.

APPENDIX

DEFINITIONS OF TERMS

Forest Area

Forest land area.--Includes (a) lands that are at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting influence on the climate or on the water regime; (b) land from which the trees described in (a) have been removed to less than 10 percent stocking and which has not been developed for other use; and (c) afforested areas. (Forest tracts of less than 1 acre and isolated strips of timber less than 120 feet wide are excluded.)

Commercial forest land area.--Forest land that is (a) producing, or physically capable of producing, usable crops of wood (usually saw timber), (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Noncommercial forest land area.--Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order, but that otherwise qualifies as commercial forest land, or (b) incapable of yielding usable wood products (usually saw timber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Forest Types

Forest types are defined according to the species, or species group, that make up the major portion of the stand in terms of board feet in saw-timber stands or number of stems in other stands.

"Other hardwood types" include aspen-pin cherry, oak-white pine, hardwood-spruce, and bottomland hardwoods. The latter type consists mostly of blackgum, white oak, red maple, elm, and ash. "Other softwoods" include hard pine-oak, white pine, white pine-hardwood, and hemlock.

Stand-Size Classes

Saw-timber stands.--Stands with saw-timber trees having a minimum net volume per acre of 1,500 board feet, International $\frac{1}{4}$-inch rule.

Pole-timber stands.--Stands failing to meet the saw-timber stand specifications, but at least 10 percent stocked with pole-timber and larger trees (5.0 inches d.b.h. and larger), and with at least half of the minimum stocking in pole-timber trees. (Pole-timber stands carry at least 200 cubic feet per acre.)

Other stands.--Forest stands that do not qualify as saw timber or pole timber: stands of seedlings and saplings; nonstocked areas.

Tree Classes

Saw-timber trees.--Trees of commercial species that contain at least one merchantable sawlog as defined by regional practice and that are of the following minimum diameters at breast height (d.b.h.); Softwoods 9.0 inches and hardwoods 11.0 inches. (All butt sawlogs are considered merchantable. Where the butt is defective, upper sawlogs are considered merchantable if they account--in terms of aggregate volume--for 50 percent or more of the gross volume below the top of the uppermost sawlog. Softwood sawlogs are at least 6 inches in diameter inside bark at small end; 8 to 16 feet in length; sound and straight enough to be manufactured into standard lumber. The smaller logs are generally free of surface defects other than small tight knots. Hardwood sawlogs are at least 8 inches in diameter inside bark at small end; 8 to 16 feet in length; suitable for sawing into standard lumber, construction timber, or ties.)

Pole-timber trees.--Trees 5.0 inches d.b.h. and larger of commercial species that do not meet the specifications for saw-timber trees but do meet regional specifications of species, soundness, and freedom from defect. (These are the trees that are straight and clear enough to make saw-timber trees eventually.)

Seedling and sapling trees.—Trees of commercial species less than 5.0 inches in diameter at breast height.

Cull trees.--Live trees of saw-timber or pole-timber size that are unmerchantable for sawlogs now or prospectively because of defect, rot, or species.

Timber Volume

Growing stock.--Net volume, in cubic feet, of live saw-timber trees and live pole-timber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

(This volume is also given in rough, standard cords, bark included. Cord volume is derived from cubic-foot volume by applying a factor of 80 cubic feet per cord.)

Live saw-timber volume.--Net volume in board feet, International ¼-inch rule, of live saw-timber trees.

FOREST SURVEY METHODS

These forest statistics for the Eastern Section of West Virginia are based on information gathered from sample plots. These plots are distributed randomly over the entire area.

They were first located on aerial photographs. Trained photo interpreters then examined the photos and classified each forest plot according to stand size. Field crews inspected enough plots on the ground to attain a specified level of statistical accuracy. Species and volume data were collected on these ground plots.

The survey was designed for maximum accuracy in the estimate of total merchantable cubic volume.

ACCURACY OF THE ESTIMATES

The estimates in this report may contain two kinds of error.

First, photo interpreters may make mistakes of judgment, and fieldmen may make mistakes in measuring or recording. There is no practical way of finding out just how often such errors occur. But they are kept to a minimum by closely checking all phases of the work.

The second kind of error is associated with sampling procedures. The size of this error can be measured. In Eastern West Virginia the chances are 2 to 1 that the error will not exceed 1.4 percent of the total forest area, 5.6 percent of the total board-foot volume, or 3.6 percent of the total cubic-foot volume.

These percentages show that the area estimates are more reliable than the volume estimates, and that the cubic-foot estimates are more reliable than the board-foot estimates.

In each of the tables, the total figures are more reliable than the subtotals. The subtotals are more reliable than any of the individual figures. Figures that are small in relation to totals are subject to larger sampling errors.

SPECIES TALLIED

The various commercial tree species tallied in the Eastern Section of West Virginia are listed below.[1] Approved common names are shown in parentheses if these differ from the brief name used in the tables.

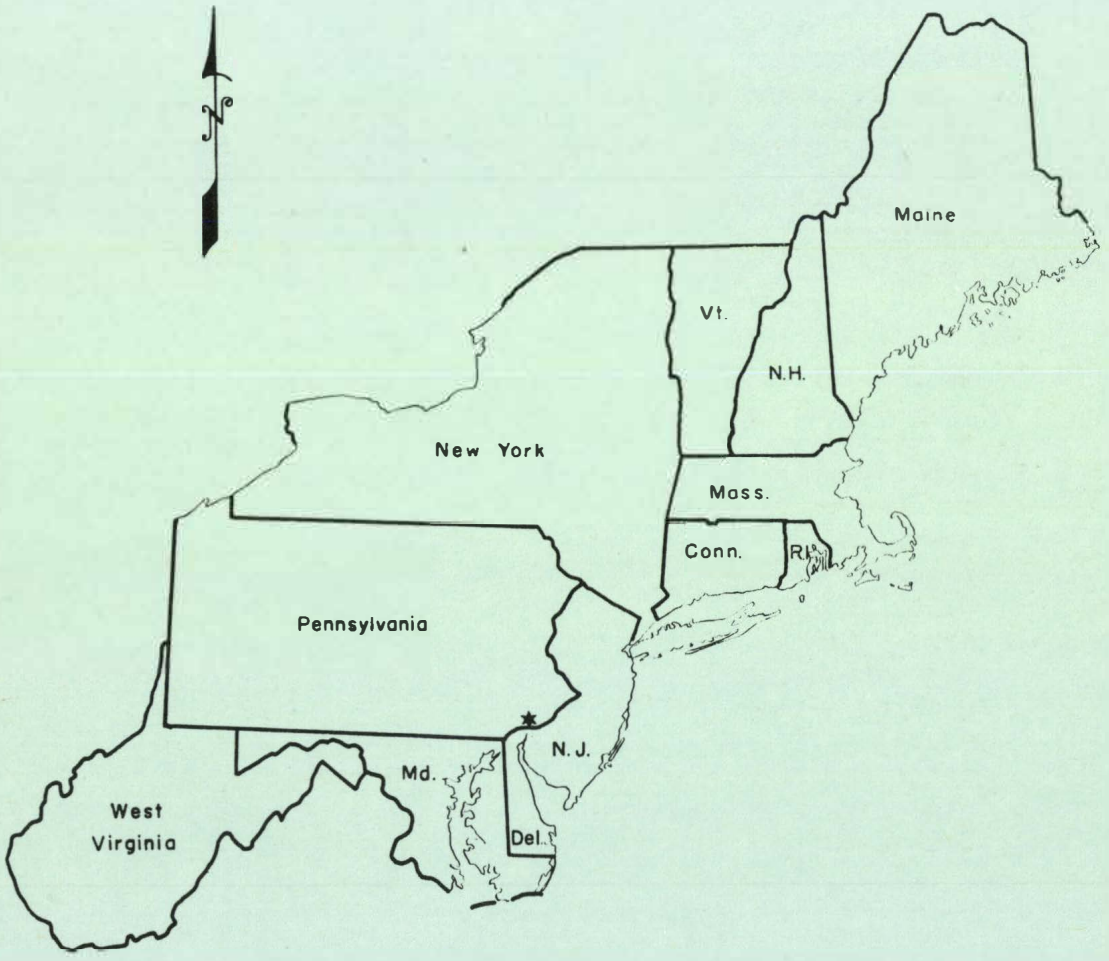
Hardwoods

Red oak (Northern red oak)	- Quercus borealis
Yellow birch	- Betula lutea
Chestnut oak	- Quercus montana
Beech (American beech)	- Fagus grandifolia
Sugar maple	- Acer saccharophorum
Red maple	- Acer rubrum
Basswood (American basswood)	- Tilia americana
White oak	- Quercus alba
Hickory	- Carya species
Yellow-poplar	- Liriodendron tulipifera
Black cherry	- Prunus serotina
Cucumbertree	- Magnolia acuminata
Other hardwoods	
(Sweetgum)	- Liquidambar styraciflua
(Blackgum)	- Nyssa sylvatica
(Black locust)	- Robinia pseudoacacia
(Ash)	- Fraxinus species
(Bigtooth aspen)	- Populus grandidentata
(Quaking aspen)	- Populus tremuloides
(Buckeye)	- Aesculus species
(Butternut)	- Juglans cinerea
(Elm)	- Ulmus species
(Honeylocust)	- Gleditsia triacanthos

Softwoods

Spruce (Red spruce)	- Picea rubens
(Black spruce)	- Picea mariana
White pine (Eastern white pine)	- Pinus strobus
Hemlock (Eastern hemlock)	- Tsuga canadensis
Hard pine (Pitch pine)	- Pinus rigida
(Virginia pine)	- Pinus virginiana
(Shortleaf pine)	- Pinus echinata

[1] U.S. FOREST SERVICE. CHECK LIST OF THE NATIVE AND NATURALIZED TREES OF THE UNITED STATES INCLUDING ALASKA. 325 PP. WASHINGTON. 1949.



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